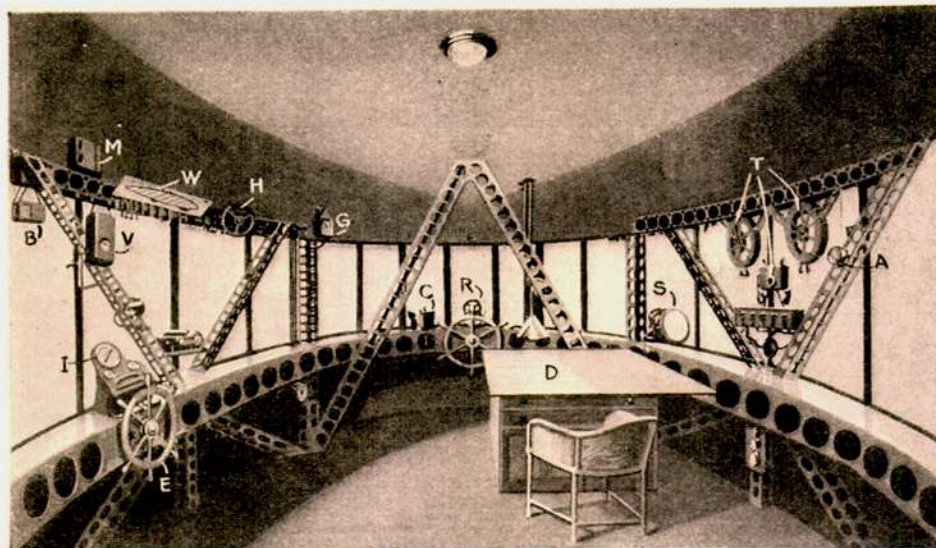


# Flying with an Airship Captain

*The Veteran Commander of Navy Dirigibles Tells of His Experiences in Piloting the Los Angeles*

By Lieut. Commander  
CHARLES E. ROSENDAHL



Control room equipment of the *Los Angeles*. A—air speed indicator; B—barograph; C—magnetic compass; D—chart desk; E—elevator wheel; G—gas thermometer; H—helium gas release toggles and master valve wheel; I—inclinometer, aneroid barometer, and stop watch; M—mooring force indicator; R—rudder wheel; S—searchlight; T—engine room telegraphs, telephone; V—height change indicator; W—water ballast chart and release.



Chief Engineer's assistant at his post at the engine telegraph control of the *Los Angeles*.

**W**E WERE just back from Panama, one March night, and the *Los Angeles* was being hauled down to the ground in its second landing attempt. The men on the ropes and those holding the handrails on the outside of the cabins were walking the ship across the field to the hangar. Down the field a cloud of snow arose—a squall was approaching. It hit. The great ship swayed in the gust. Dragging the ground crew with her, she was swept toward the trees that border the field.

"Let go all lines!" Overboard went water ballast. The ship leaped into the air. Five or six of the ground crew had not been quick enough to let go. Then they were afraid to jump. They were carried up, clinging like flies to the outside of the cabin, their legs dangling in mid-air. Five hundred feet from the earth, they were pulled in through the cabin windows. Cruising about until the squall had passed, perhaps an hour later, the ship landed safely and was docked in the hangar.

That night provided the closest shaves the *Los Angeles* ever had. Only an hour or so before, in an attempt to tie to the mooring mast, rough winds had jerked the ship about so violently that a nine-sixteenth-inch mooring cable snapped just in time to save the framework of the ship from damage.

Operating airships has provided many an exciting

experience. Once the *Los Angeles* narrowly avoided collision with an airplane at night. Another time she was shot at, in the air, by an over-enthusiastic New Jersey duck hunter. Torn fins have been patched high in the air, and our ships have flown through lightning storms.

The high spots of a flight for an airship captain are its start and its finish. Launching an airship requires extreme care. The crew—say eight officers and thirty enlisted men—are at their stations in the ship, while the ground crew walks it out of the hangar. The captain walks out beside the mooring officer, who, from the ground, will direct the maneuver. The most critical part is getting the ship past the hangar door. At that moment a sideward gust on the huge bag might sweep it with thousands of pounds' force out of the ground crew's hands and

**S**QUADRON Commander of the United States Navy's airship fleet at Lakehurst, N. J., Commander Rosendahl is America's foremost authority on dirigible navigation. Until May of last year he captained the *Los Angeles*, and previously was second in command of the ill-fated *Shenandoah*. Here he recalls some of his exciting experiences, and describes the interesting technique of handling a 656-foot air liner.

against the wall. The take-off is purposely delayed until such danger is minimized, and when the ship is safely on the field the captain steps into the control cabin.

A green flag, or at night a green lantern, in the hands of an orderly makes it easy to see where the mooring officer is. "Give us a weigh-off!" is called out to him. The buoyancy of the ship has already been adjusted roughly in the hangar, and this is the final weighing before we ascend.

"Stand by to weigh off!" commands the mooring officer. The order passes from mouth to mouth down the length of the 656-foot ship. The ground crew sets the control car and the after gondola down on the ground, holding them by the handrails along the sides. At a distance from the ship are the men on the handling lines.

"Hands off!" They allow the ship to rise to arm's height, then at "Hold!" they bring it back, estimating the buoyancy, if it tends to lift, by the weight of the men required to hold it down. The reports come in: "Four hundred pounds light, aft." "Three hundred pounds light, forward."

That means that each end can lift that many pounds; in this case the total buoyancy of the ship is 700 pounds, a good



The Navy dirigible *Los Angeles*, "a real ship in every sense of the word." She has flown more than 100,000 miles. The longest voyage was to Panama and return.

figure. But it is comparatively too heavy forward for the nose to rise first, as it should. A man aboard the ship is sent from the forward end aft. The trim is now satisfactory.

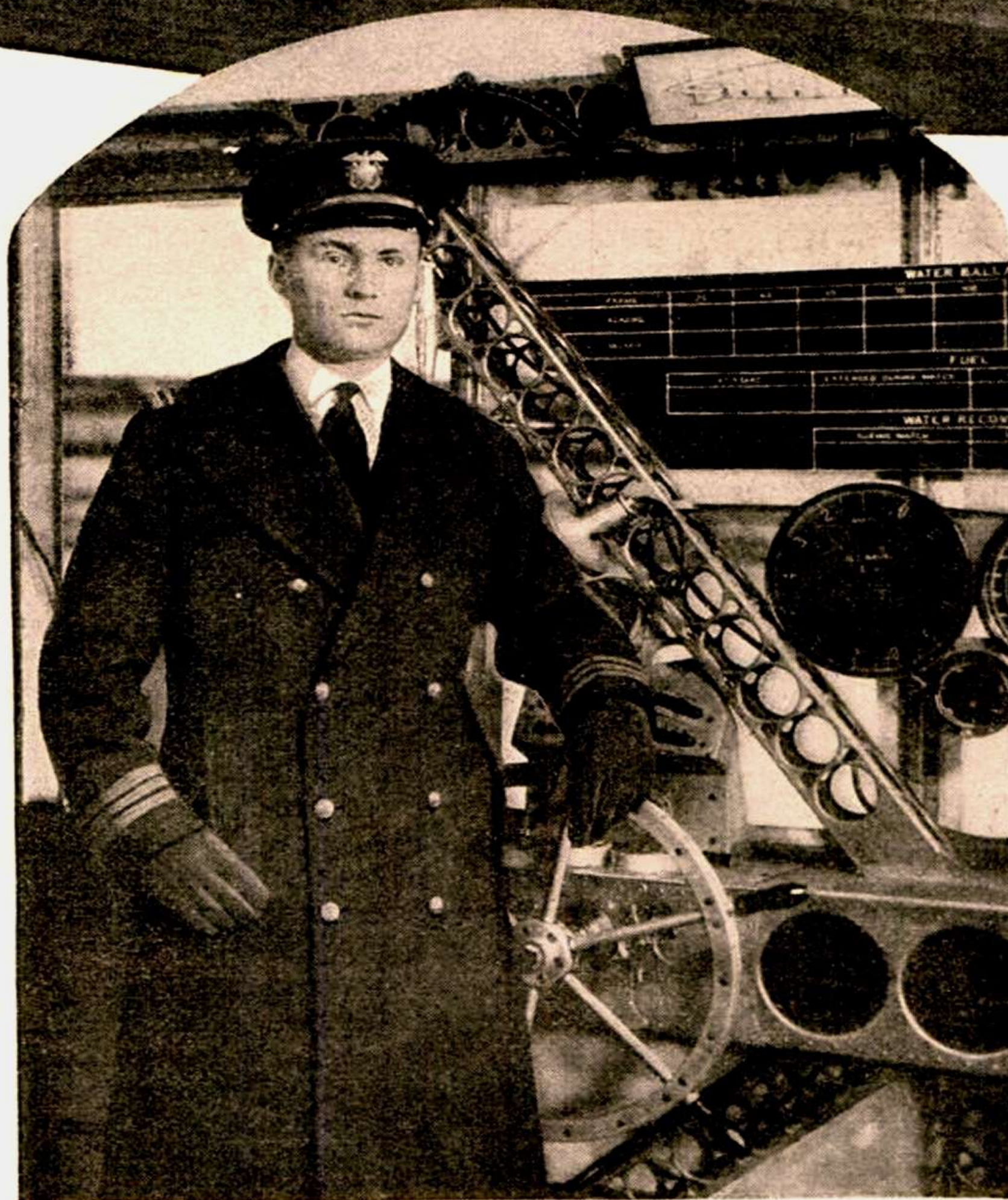
"**S**TAND by for 'Up ship!'" Ropes are cast off. In the control cabin the Engineer Officer pulls over the indicator of the engine telegraph to "Two engines ahead, half speed." A gong clangs in the motor gondolas. Compressed-air starters spin the motors. They fire. A stream of air shoots back past the elevators or "flippers" that the elevator man is ready to raise, to force up the nose of the ship as soon as it is clear of the ground. The ground crew is tugging at the handrails along the cars to hold back the throbbing ship.

"Up ship!" The ground crew literally throws the ship high in the air. We go up nose first. "All engines ahead, cruising!" signal the engine telegraphs. We're off!

Almost every week, on the average, the *Los Angeles* takes the air on training flights, cruising within a 500-mile radius of the Lakehurst Naval Air Station. Longer trips are made for special purposes, such as the recent flight to participate in the air meet at Cleveland, Ohio. Since we demonstrated hooking on an airplane in flight at that meet, by the way, we have repeated the stunt successfully nearly every time the ship goes out, and it is getting to be a routine matter.

Our longest flight was the trip to Panama and back, more than 2,000 miles each way. We have landed the ship, at sea, at the mast of the tender *Patoka* and on the deck of the airplane carrier *Saratoga*. Two years ago we searched the North Atlantic for signs of the missing Grayson transatlantic plane. We spent all of one summer calibrating radio beacon stations along the Atlantic coast from Boston down past Hatteras, operating part of the time from the tender *Patoka* as a base. Other jobs have been numerous, and in all the *Los Angeles* has flown well over 100,000 miles.

Once in the air, the ship ascends under power by pointing the nose upward, but can climb also by dropping



Lieut. Commander Charles E. Rosendahl, standing beside the elevator wheel of the *Los Angeles*, which he commanded for three years.

water ballast. She comes down either by flying down or by valving off helium gas. Toggles in rows, small handles shaped like telephone receivers, line the side of the control cabin and govern the release of ballast and of gas. By pulling one of the handles and counting seconds, we estimate just how many pounds of water have been dropped from one of the ballast bags, or by how many pounds the lifting force of one of the gas cells has been decreased.

A steersman at the elevator wheel, on the left of the control cabin, guides the ship up or down; another at the forward end steers it to port or starboard. On

ship than the *Shenandoah*, which had a long, slim hull. That slenderness, I think, was the main reason why the *Shenandoah*, bound for the midwest four years ago, was wrecked when it ran into a line squall near Ava, Ohio. Caught between sharp and conflicting vertical air currents—the most dangerous thing that can happen to any aircraft in the air—her structure broke from unusual aerodynamic forces too great for it. Several of us, just above the control cabin when the crash came, heard a metallic noise of wrenching girders—and, in the gloom of daybreak, saw the after portion of the ship free itself and fall. Below, through

the gap in the structure where the forward car had torn away, we saw the ground disappearing rapidly. Shouts disclosed that there were eight men in the rising section. With each man detailed to a station and a duty, we free-ballooned our section of the ship for more than an hour and then descended safely. Many of the men in the other part of the ship, we found, had escaped when it crashed. Of the forty-three men originally aboard, (Continued on page 158)



The ground crew holding the control car of the *Los Angeles* to earth by handrails along the side. Once, in a sudden squall, some of the crew were carried, dangling, 500 feet high.



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## Flying with an Airship Captain

(Continued from page 41)

twenty-nine were safe and fourteen dead. Our noninflammable helium undoubtedly accounts for the many survivors.

With up-to-date weather service, an airship is extremely unlikely to run into such a storm; but even if it should, I think the *Los Angeles* and future ships would have a good chance to weather it. And I expect future airships will have less to fear from storms of any kind, for increasing strength goes with larger size.

Lightning is popularly regarded as a terror to airships—but that is a fallacy. Even hydrogen-filled dirigibles have often been struck by lightning with no more damage than a small hole fused in the metal bow cap. The metallic frame absorbs the electricity. I know only one authentic case of an airship destroyed by lightning—a German ship that was valving off hydrogen in a thunderstorm when lightning ignited the escaping gas and set the ship afire. The *Graf Zeppelin*, leaving Japan on its round-the-world flight, skirted a severe lightning storm without fear of damage.

A HELIUM-FILLED ship such as the *Los Angeles* is virtually immune. As an additional precaution, the parts of the metal frame are carefully "bonded" or connected together so that no small spark, induced by lightning, could set fire to the gasoline. To test it, the entire hangar is darkened and electricity at ten or twenty thousand volts is applied to the frame. Sparks instantly reveal any loose connections. This was done to the *Shenandoah* when it was built at Lakehurst, and the *Los Angeles* had the same test in Germany.

An airship flying at night carries running lights just as an ocean liner does—but double the number. That is so that other aircraft can see her and tell her heading. The wisdom of this was demonstrated one moonlight night when the *Los Angeles* was flying between Philadelphia and Trenton, N. J. Out of the darkness a mail plane came roaring directly at the ship. None too soon the pilot spotted the lights and swerved out of the way.

In a collision an airplane would no doubt suffer more than the airship. At most such a crash might puncture the envelope and rupture a gas cell or two, but there would be plenty of reserve buoyancy to make port. The airplane would undoubtedly fall, a total wreck. The reason an airship is hard to force down is that the lifting gas is carried in separate cells inside the outer envelope, just as a steamer is built with water-tight compartments.

ONE of the questions asked most frequently is what a dirigible commander would do if he ran out of fuel and no mooring place was near. In that case he would "free balloon" the ship—that is, fly it as a balloon and drift with the wind—to an emergency landing spot. Over the landing place, he would valve gas to bring the ship down, and check its fall near the ground by dropping ballast. For a landing place he would either choose the lee of a patch of woods or land the ship squarely on top of a grove of small trees. German airship men tell of landing wartime Zeppelins, out of fuel on the way back to their bases, on top of scrubby trees until a new fuel supply could be put aboard.

I think the roughest airship cruising I have ever done has been over the mountains in the southwestern part of the country, both in the *Shenandoah* and the *Graf Zeppelin*. When strong lateral gusts strike, an airship may roll a little from side to side as a surface ship does. Unlike an ocean liner however, an airship seldom lists more than an angle of three or four degrees. I have never seen anyone seasick on an airship.

Occasionally minor repairs are made in flight—patching a

(Continued on page 159)

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## Flying with an Airship Captain

(Continued from page 158)

line, a rod, or a tear in the fabric. One of the most difficult repairs effected in flight was fixing the torn upper fin of the *Shenandoah* on a trip to St. Louis, in September, 1923. It was necessary to send three or four men to work in a cramped, dangerous position on the inside. A slip might have sent one of them plunging through the cover.

On one flight we did have a "man overboard" scare. We had taken up a party of civilians, and were flying high when someone reported a large hole in the envelope at the after end of the ship beside the catwalk that runs the length of the interior. We were relieved to find the civilian who had punched the hole still aboard. He had gone exploring aft, and put a foot through the envelope into thin air. It hurt neither the ship nor him, but it did give him the thrill of his life.

THE best illustration of the way that an airship is flown, to my mind, is the fact that fog does not disturb us in the least. An airship navigates, not solely by landmarks, but by instruments. The altimeter tells us we are a safe distance from the earth. A magnetic or gyro compass reports our direction, and the air speed is known from an air speed meter. We measure the drift by sighting on a point on the surface of the earth; or, if we are at sea, by dropping a flare that ignites when it strikes the water. It spouts smoke and flame for five minutes and serves as a point of reference.

Even an airplane pilot will see instruments that are new to him in the control room of an airship. One is a "gas pressure alarm." When an airship rises, the lifting gas in the cells expands because of reduced atmospheric pressure. Automatic safety valves release it before the accumulated interior gas pressure would burst the cells. At the so-called "pressure height" where the safety valves are about to operate, the alarm rings a bell and lights a light in the control cabin. If the commander does not want to lose helium gas, he immediately checks the ship's ascent.

In the daytime the sun's radiant heat raises the temperature of the gas in the cells above that of the surrounding air, and increases its lift—despite the fabric of the gas cells, a foot of air space, and the envelope with its reflecting layer of two coats of aluminum "dope," or paint. We call this temperature difference "superheat." It is important for a dirigible commander to know it, so that he can avoid valving off gas to hold the ship down when the setting sun will soon make it heavy again—or dropping ballast, during the night, when the ship will tend to rise of its own accord in the morning. He reads this important temperature difference from a "superheat meter" that the United States Bureau of Standards helped the Navy to perfect. At the touch of a switch it gives the "superheat" directly in degrees, at either the forward or after end of the ship.

DESPITE the wide impression that an airship usually comes down by releasing its lifting gas, the normal way of landing the *Los Angeles* after a trip is to fly it right in. Heading into the wind, the motors are slowed until the ship is nearly stationary and then ropes are dropped to the ground crew. They haul us down by main force against the buoyancy of the ship. Occasionally some of the ground crew get a shower bath when the ship, coming down too fast, checks its fall by releasing a little of its water ballast.

The *Los Angeles* provides an impromptu fireworks display when it lands at a mooring mast. She carries a Very light pistol, of possible use as a distress signal but principally used in the mooring maneuver. When the main cable is dropped we fire a

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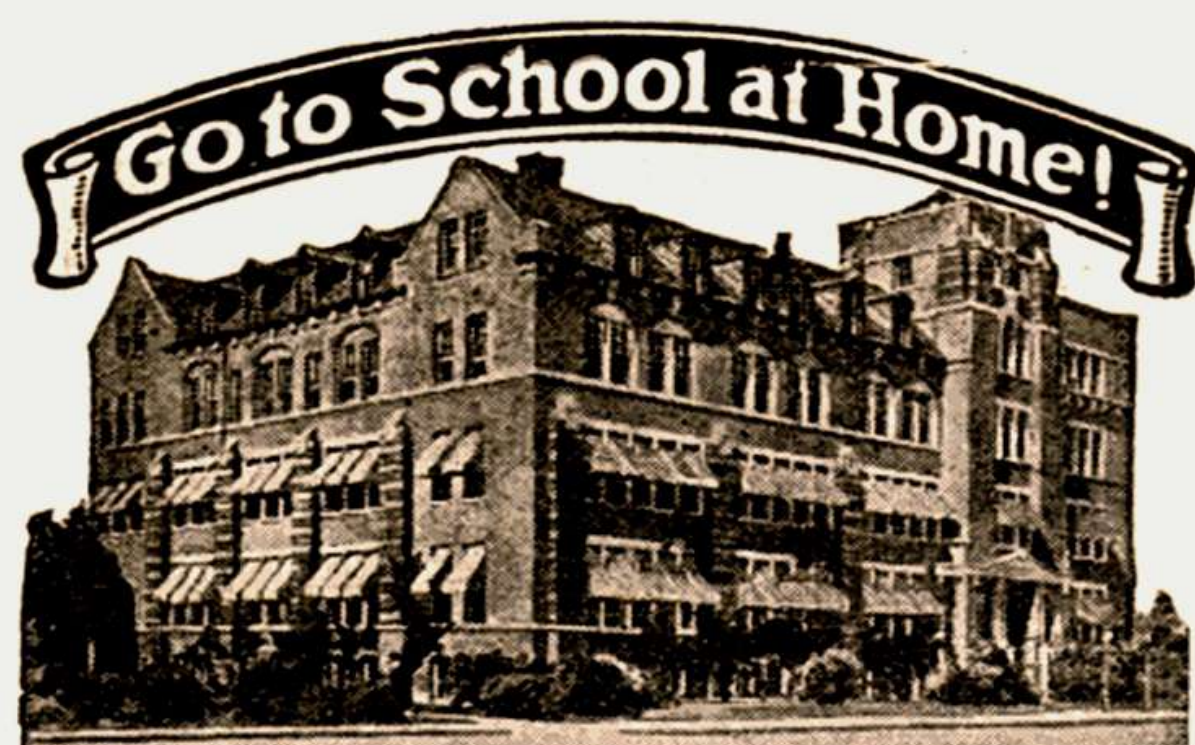
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## Flying with an Airship Captain

(Continued from page 159)

white star. Dropping the starboard yaw wire is accompanied by a green star, and the port yaw wire by a red one. This calls attention to the dropping of the wires, which may be difficult to see, particularly at night. The ground crew respond with the same lights as they couple each wire to the corresponding ground wire. The Very lights are used both day and night, and the brilliant colored balls are easily seen in broad daylight.

When landing in fog—as just a few weeks ago—the ship sometimes is brought down slowly by valving gas. It is a little ticklish, but usually there are holes in the fog through which the earth can be seen and the landing cable dropped. Abroad there was developed a way of marking the landing field by captive balloons tethered just above the fog layer. Whistles sounded or guns fired at interval often help when landing a ship in the fog.

**BRINGING** an airship into its harbor has one big difference from guiding an ocean liner home. There is no "harbor pilot" who takes responsibility for the maneuver. The mooring officer, on the ground, directs both the take-off and the landing, but the responsibility for the safety of the airship belongs to the captain alone. If the maneuver does not suit him, he can step in and give orders at any time.

It is a weighty responsibility, but few dirigible commanders would care to be relieved of it. There is a majesty about such a ship as the *Los Angeles* that those who have looked at her in her hangar know. Taking this great ship through the clouds is a thrill that comes to few men. For all her bulk, she is a graceful, responsive ship of the air—the forerunner of even greater liners of the future.

## "Smoke Ball" May Account for Ball Lightning

**MANY** are the stories of balls of fire that enter houses during lightning storms, are reported to roll or float about, and often at the end explode with a loud report and lingering smell described as "sulphurous." Unfortunately such phenomena have a way of happening, if at all, when no scientist is around to observe them. The following account, therefore, of an experience of Professor George Winchester, Rutgers University physicist, given in a recent issue of *Science*, was especially interesting. It describes another strange phenomenon which offers some resemblance to ball lightning, observed when the writer was motor-ing recently with his brother near Peoria, Ill.

"Just as we were ascending a gentle slope a very brilliant lightning flash occurred . . . about six feet from the trunk of a hedge tree at our right we observed a ball of smoke about two feet from the ground. The ball appeared to be about eighteen inches in diameter and perfectly spherical. The color of this smoke, if it was smoke, was a yellowish brown. We could not find even a withered twig or leaf. We raised the question of whether this "ball of smoke" would have been a "ball of fire" if the phenomenon had taken place after dark."

What caused this strange ball? According to a hypothesis suggested by a British chemist, E. Kilburn-Scott, to account for ball lightning, a bolt of lightning might possibly form a concentrated globe of semiliquefied nitric oxide gas formed by the combination of elements in the air through the action of the electric spark. Such a gaseous ball would be of such a density that it would gravitate slowly to earth. It might be luminous at light, not so by day. Most significant, its outer layer would undoubtedly react with the air, giving off brown fumes of a color like that described by Prof. Winchester.

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**Clear reception**—full modulated tones without distortion. Volume with emphasis on clarity. Our goal was to blend the qualities of the Neutrodyne circuit with the superb tone quality and great receiving range of the Super-Heterodyne.

**Tuning** on the WHITRAD DUO-TROL is confined to two dials, located to facilitate handling. These dials log accurately, both dials having the same scale readings on any given station.

Many of the powerful broadcasting stations are only six to ten meters removed from each other in wave length. Selectivity—the ability to tune in a station without interference from another—is an important feature of the WHITRAD DUO-TROL.

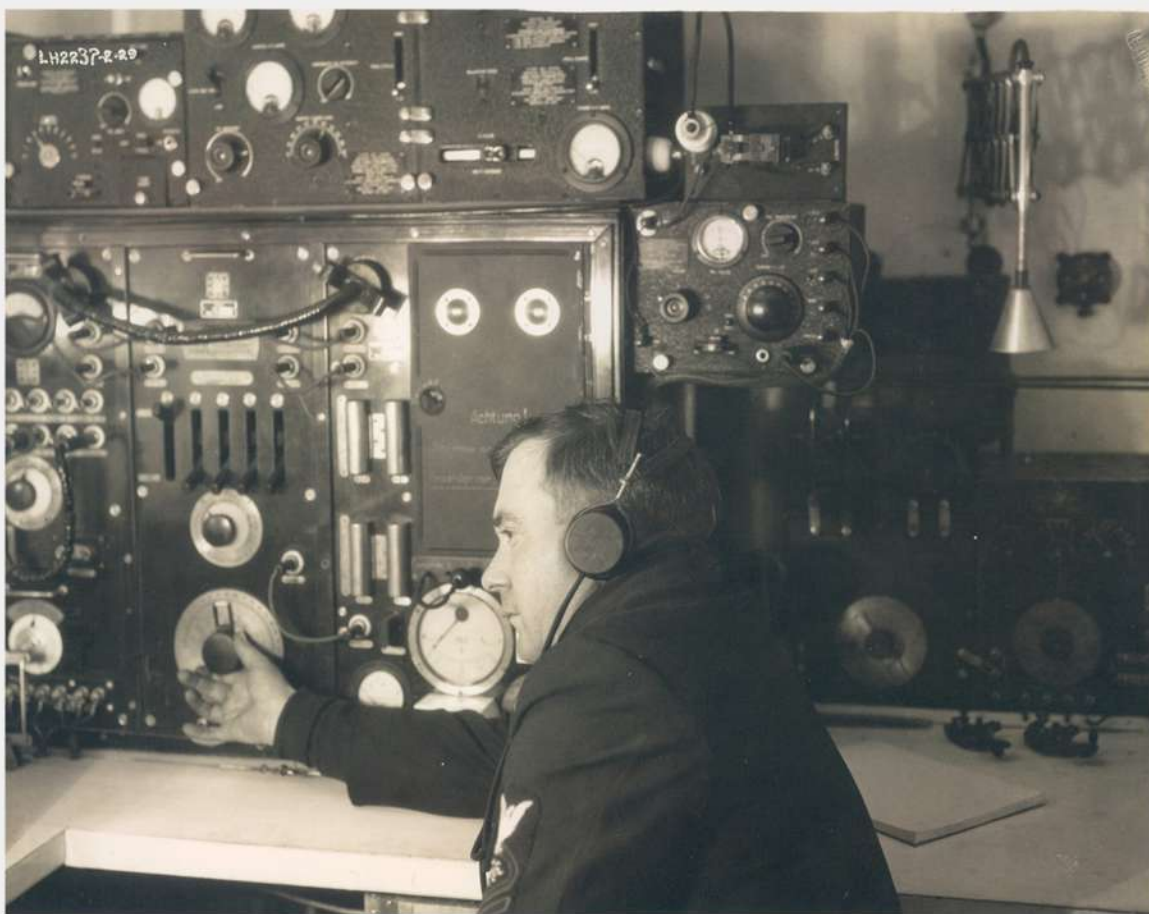
**Loud speaker volume** without distortion. The WHITRAD DUO-TROL detects the weakest impulse—signals that are dead to other receivers,—and builds them up to satisfactory loud speaker audibility.

We were the first in Central New York to place a radio frequency receiver on the market, and the WHITRAD DUO-TROL is the culmination of five years of gradual development and perfection of a receiver that is a distinct advance over the Neutrodyne.

Our greatest achievement, however, has been the ability to place a receiver of its type on the market at a comparatively low price of \$115.00,—still maintaining high quality in construction, and "low loss" in every construction feature.



## Whitrad Duo-trol



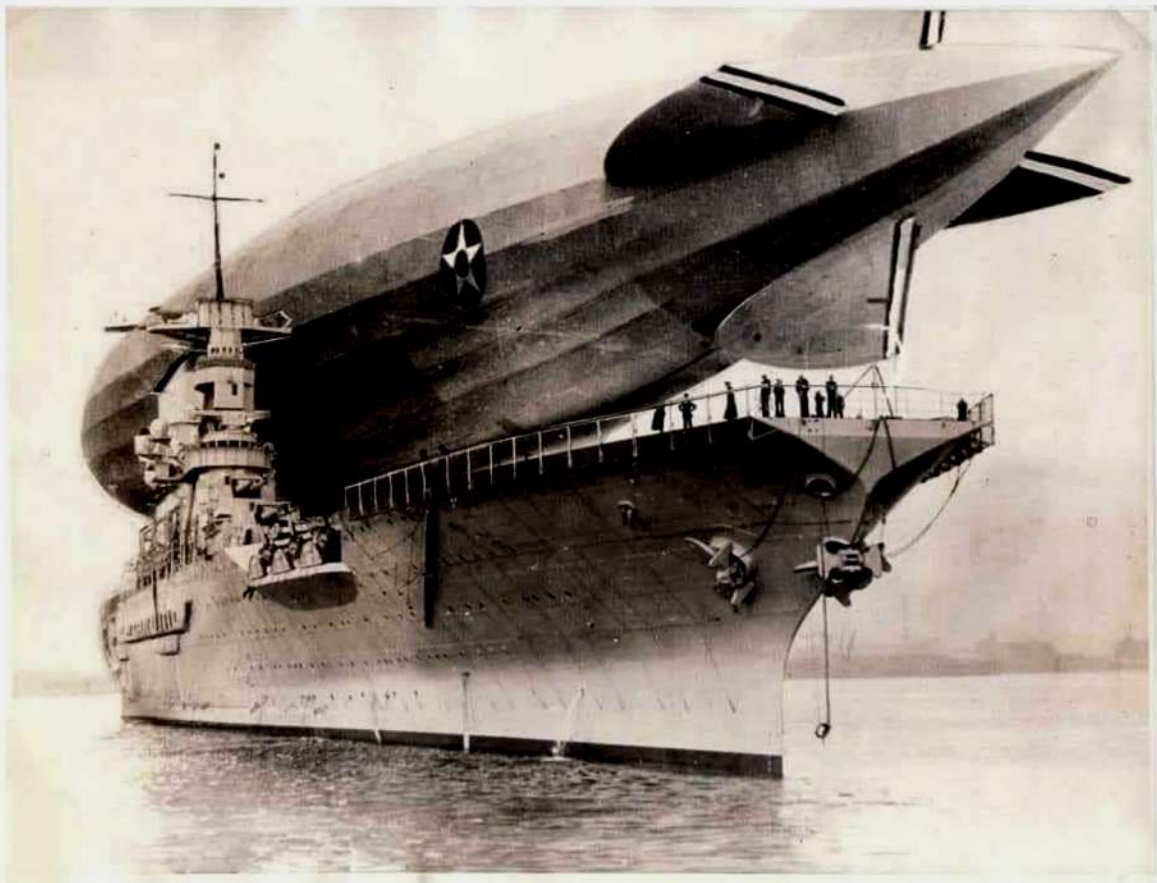
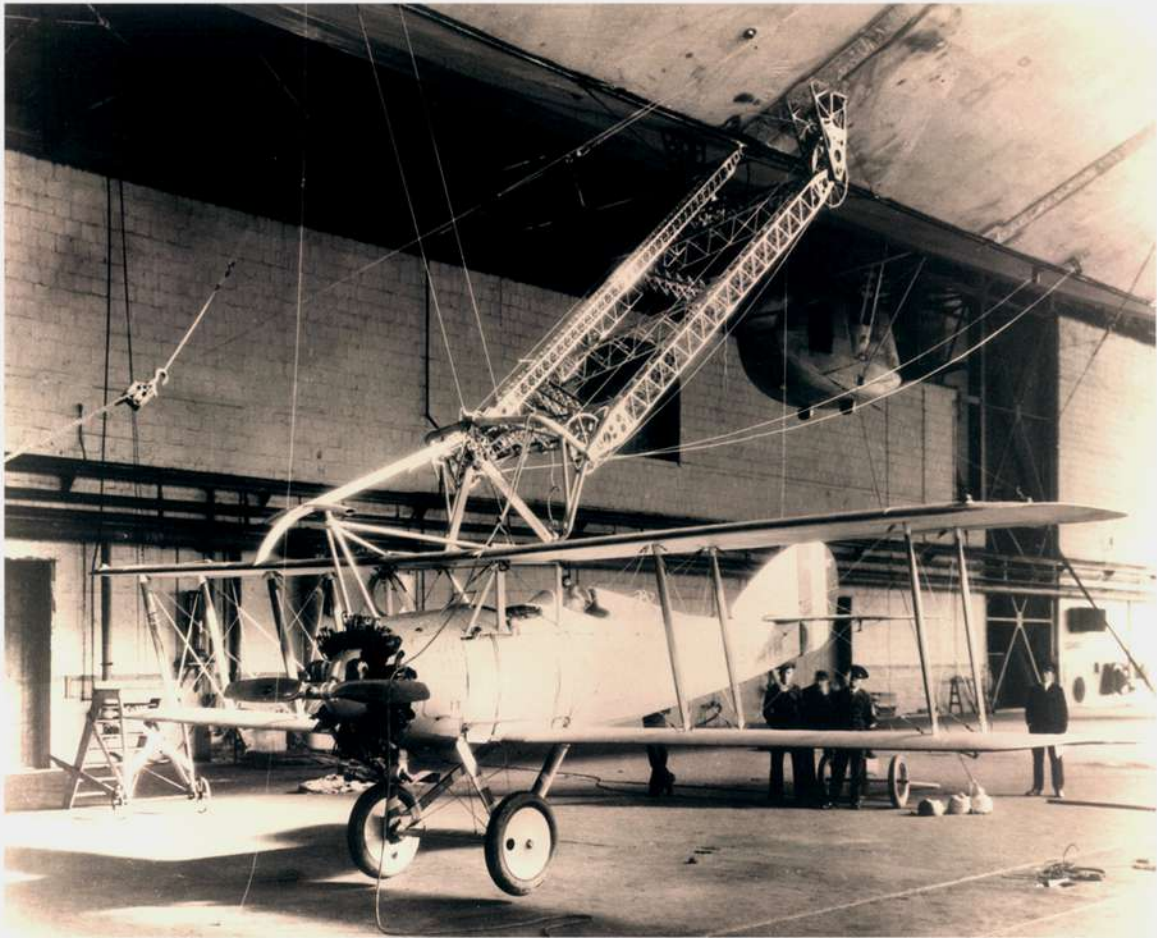
Chief Radioman Cesare P. Cavadini



Mess Attendant 2/C Pacifico Santiago



Vought OU-1 on USS Los Angeles Trapeze



USS Los Angeles Moored To USS Saratoga CV-3